

EXHIBIT NO. PTX-005 evid.  
CAUSE NO. 3:22-cv-00734-DPJ-HSO-LHS  
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CLERK: SHONE POWELL

FEB 26 2024

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF MISSISSIPPI  
Candice Crane, REPORTER

**UNITED STATES DISTRICT COURT  
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI  
NORTHERN DIVISION**

MISSISSIPPI STATE CONFERENCE OF THE  
NATIONAL ASSOCIATION FOR THE  
ADVANCEMENT OF COLORED PEOPLE; DR.  
ANDREA WESLEY; DR. JOSEPH WESLEY;  
ROBERT EVANS; GARY FREDERICKS; PAMELA  
HAMNER; BARBARA FINN; OTHO BARNES;  
SHIRLINDA ROBERTSON; SANDRA SMITH;  
DEBORAH HULITT; RODESTA TUMBLIN; DR.  
KIA JONES; ANGELA GRAYSON; MARCELEAN  
ARRINGTON; VICTORIA ROBERTSON,

*Plaintiffs,*

vs.

STATE BOARD OF ELECTION  
COMMISSIONERS; TATE REEVES, *in his official  
capacity as Governor of Mississippi*; LYNN FITCH, *in  
her official capacity as Attorney General of  
Mississippi*; MICHAEL WATSON, *in his official  
capacity as Secretary of State of Mississippi*,

*Defendants,*

AND

MISSISSIPPI REPUBLICAN EXECUTIVE  
COMMITTEE,

*Intervenor-Defendant.*

**CIVIL ACTION NO.  
3:22-cv-734-DPJ-HSO-LHS**

**EXPERT REPORT OF DR. JORDAN RAGUSA**

**Expert Report Evaluating Mississippi's Challenged Districts**

Dr. Jordan Ragusa

August 28, 2023

**[1] Education, Qualifications and Expert Analysis**

I am an Associate Professor in the Department of Political Science at the College of Charleston in Charleston, South Carolina. I began my career as an Assistant Professor in the fall of 2011 and was tenured in 2017 with exemplary ratings in teaching, research, and service. I serve in three administrative roles at the College of Charleston: as the Associate Chair of my department, as the Research Director for the Center for Public Choice and Market Process, and as Director of the American Politics Research Team.

I teach undergraduate classes on a range of intersecting topics: American politics, the Congress, American political development, national elections, research methodology, and statistical computing. For example, in the spring of 2023 I taught a senior seminar entitled “Elections, Voting, and Data Science” that included units on statistical analysis, computing, and redistricting. I also teach a graduate course on data analysis and statistical computing in the college’s Master of Public Administration (MPA) program.

I received my Ph.D. in political science from the University of Florida in 2011. My graduate coursework spanned two fields: American politics and quantitative research methodology. I was awarded a “high pass” on my quantitative methods qualifying exam and taught introductory data analysis, linear modeling, and statistical computing in my PhD program at the University of Florida. Additionally, in both 2006 and 2007, I took graduate classes on statistical methods for the social sciences at the University of Michigan.

My academic work includes over a dozen peer-reviewed articles on national politics, South Carolina politics, the Congress, political parties, public administration, national elections, and political economy. My peer reviewed publications also include two co-authored books: “First in the South: Why South Carolina’s Presidential Primary Matters” (2020, *University of South Carolina Press*) and “Congress in Reverse: Repeals from Reconstruction to the Present” (2020, *University of Chicago Press*).

I am frequently asked to provide expert commentary on various issues related to American politics. I have been quoted in *The New Yorker*, *USA Today*, *The Post & Courier*, and South Carolina’s *The State* newspaper and have appeared on *South Carolina ETV*, *South Carolina Public Radio*, *National Public Radio*, *Bloomberg TV*, *Matter of Fact with Soledad O’Brien* and several local news programs. I have published roughly thirty op-eds and editorials in newspapers such as *The Washington Post*, *The Post & Courier*, and *The State*. I am often invited to speak to several organizations and groups. For example, in the fall of 2020 I gave an invited lecture on polarization and presidential elections at Clemson University.

My scholarship includes several forms of consulting, public service, and expert analysis. I have worked as a consultant for local organizations including the City of Charleston Police Department, Charleston County Human Resources, Lowcountry Local First, and the Alliance for Full Acceptance. My work for these organizations involved the statistical analysis of political, social, and administrative data. Currently, I am on the advisory board for a local civil rights and civics educational organization called “C3: Charleston Civil Rights and Civics.” I am also currently a teaching fellow in the “Civic Engagement & Voting Rights Teacher Scholars” program at Clemson University. In these two roles, my primary responsibility is to create open access educational materials that focus on civil rights, voting rights, and civics.

I was retained by the American Civil Liberties Union (ACLU) from 2021 to 2022 in a federal racial gerrymandering lawsuit (*South Carolina NAACP v. Alexander*). I authored three expert reports, provided deposition testimony, and was accepted by the Court as a qualified expert on congressional elections, South Carolina politics, and quantitative analysis. My analysis and testimony focused on the disaggregation of race and partisanship in the composition of South Carolina's redrawn district. In the state legislative portion of the lawsuit, Plaintiffs secured a pre-trial agreement that resulted in new state House district lines in five counties, and in the congressional phase of the lawsuit, Plaintiffs won a unanimous decision by a three-judge panel striking down Congressional District #1 as a racial gerrymander. My analysis and testimony were cited by the Court as "particularly probative regarding changes in the Charleston County portion of Congressional District No. 1."

A copy of my curriculum vitae is attached as Exhibit A.

## **[2] Scope of Engagement**

I was asked by Plaintiffs' counsel to opine on whether and to what extent race was a factor in the design of the challenged districts. Specifically, my engagement letter asks me to render an opinion on this question for House Districts (HDs) #22, #34 and #64 and Senate Districts (SDs) #2 and #48. I am retained at the rate of \$250 per hour. My compensation does not depend on the results of the case, or on the opinions and testimony I may provide. Any opinions expressed in this report are solely my own and do not represent the opinions of my employer.

## **[3] Data, Software, and Materials Relied Upon**

All analyses, figures, and graphs were conducted in Stata, a statistical package commonly used in political science, economics, and other social science disciplines.

- Stata 17.0 (MP Edition)

I used Excel to download, open, and clean a portion of the data used in this report.

- Excel for Microsoft 365 (Version 2305)

I consulted several resources available on the Mississippi Automated Resource Information System (MARIS) redistricting webpage, including both chambers' old and new district maps and their respective redistricting reports. I also downloaded two "block equivalency" files that list every census block's district assignment under the enacted plan.

- <https://maris.mississippi.edu/HTML/Redistricting/Redistricting.html>

I downloaded shapefiles containing Mississippi's redistricting data from the 2020 Census. My primary analysis uses data on each census block, including both geographic data (like the county, prior district, and Voter Tabulation District (VTD) assignment of the block) and demographic data (like the racial composition and population size of the block). I obtained these data from the Redistricting Data Hub website.

- <https://redistrictingdatahub.org/dataset/mississippi-block-pl-94171-2020-by-table/>

- <https://redistrictingdatahub.org/dataset/mississippi-vtd-pl-94171-2020/>

I downloaded shapefiles that disaggregate the results of the 2020 general election to Mississippi's Census blocks. I obtained these data from the Redistricting Data Hub website.

- <https://redistrictingdatahub.org/dataset/mississippi-2020-general-election-results-disaggregated-to-the-2020-block/>

I downloaded comma-separate variable (CSV) files containing Mississippi's geographic adjacencies from the 2020 Census. I make use of the queen adjacent VTDs in my analysis. I obtained these data from the Redistricting Data Hub website.

- <https://redistrictingdatahub.org/dataset/2020-census-adjacency-files-for-mississippi/>

I reviewed the relevant provisions of Mississippi's statutory code. Mississippi's code requires districts to comply with the U.S Constitution and be contiguous, compact, minimize political subdivision splits, and follow county lines.

- Mississippi Code §5-3-101

I consulted the National Conference of State Legislatures (NCSL) redistricting law guidebook as necessary.

- National Conference of States Legislatures. October 2019. *Redistricting Law 2020*.

#### [4] Opinions

I evaluate whether race was a factor in the design of the challenged districts (HDs #22, #34 and #64 and SDs #2 and #48). I address this question in two ways. First, and foremost, my opinions are based on a multivariate analysis that examines the movement of voters between districts by the enacted plan. In addition to race, my analysis takes into consideration traditional redistricting principles and accounts for several explanations for the composition of the challenged districts. Second, my opinions are based on a range of descriptive statistics about each of the districts that help contextualize the multivariate results.

I ultimately conclude that race was a significant factor in the composition of each of the challenged districts. In every case, the multivariate analysis reveals that Black voters were excluded from the redrawn district in a statistically significant and substantively consequential fashion. In other words, the results indicate that the movement of Black voters into and out of the challenged districts was numerically large, racially disproportionate, and unlikely to have occurred by chance. Because of the control variables in the analysis, the effect of race cannot be explained away as a byproduct of partisan gerrymandering, an effort to reconfigure the districts to make them equipopulous, or the movement of voters who were geographically proximate to the redrawn districts. As a result of how the enacted plan moves Black voters between the districts, the Black voting age population in each of the challenged districts is substantially reduced.

## [5] Redrawn Districts Methodology

### *Analyzing the Redrawn Districts*

My primary analysis focuses on the district assignment of every census block in Mississippi both before and after redistricting. In other words, I explore a block's district assignment under the benchmark plan and compare that to the block's district assignment under the enacted plan. The benchmark plan refers to the 2012 state House plan and the 2019 amended state Senate plan. As the Census Bureau website<sup>1</sup> explains, blocks are "statistical areas bounded by visible features such as roads, streams, and railroad tracks, and by nonvisible boundaries such as property lines, city, township, school district, county limits and short line-of-sight extensions of roads." I also examine whether the enacted plan deviates from traditional redistricting principles, including those articulated in Mississippi's statutory code.

The key question in my analysis is whether the racial makeup of a block explains which district it was assigned to during the most recent round of redistricting. I answer this question in large part using multivariate logistic regression. Multivariate logistic regression is a statistical analysis used when the dependent variable is binary (that is, the outcome takes on the value "1" or "0") and the researcher wants to test multiple explanations of the outcome of interest.<sup>2</sup> In the three models I estimate, the dependent variable examines whether the block was added to or removed from the district in question.

Model #1 analyzes blocks that were moved into the redrawn district from a neighboring district. In this analysis the population being studied consists of every block outside the old district yet within the same county or group of counties. By focusing on the "county envelope" outside the district, Model #1 examines the most geographically proximate blocks and is therefore consistent with several traditional redistricting principles.<sup>3</sup>

First, because blocks in the county envelope are often within a dozen miles of the district, this analysis examines choices that may limit the number of political subdivision splits, most notably county splits, and could produce compact and contiguous districts. Second, given their geographic proximity to one another, county envelope blocks often share social, economic, political, and other characteristics in common. In this respect, blocks in the county envelope may be logical choices for inclusion from a communities of interest standpoint.

For example, in the benchmark plan HD # 1, which is not among the challenged districts, occupied two counties in the northeastern part of the state: Tishomingo and Alcorn. Because the district was underpopulated by 1,923 persons, HD #1 needed to add new residents to reach the ideal district size.<sup>4</sup> In this example, blocks within Tishomingo and Alcorn counties, but outside the old district,

<sup>1</sup> <https://www.census.gov/programs-surveys/geography/about/glossary.html>

<sup>2</sup> In models #1 and #2, the positive outcome (coded 1) indicates a block was moved into/out of the district and the reference outcome (coded 0) indicates the block was kept out/kept in the district. In model #3 the positive outcome (coded 1) indicates that block was moved into/kept in the district and the reference outcome (coded 0) indicates that block was moved out/kept out of the district.

<sup>3</sup> If the district was drawn into a new county outside the envelope, these newly added blocks are included in the analysis as well.

<sup>4</sup> In this report I use the term "under" and "over" populated to refer to the ideal district size. I obtained statistics on the size of each district's deviation from the ideal size from the House and Senate "Benchmark Demographics" documents on the state's MARIS redistricting website.

represent the county envelope—blocks that could be added to HD #1 without crossing county borders and/or significantly reconfiguring the district. Consistent with the principles articulated above, the enacted plan added roughly 250 blocks to HD #1 from the county envelope, and none from outside the envelope, resulting in a district that appears to be approximately as compact as the benchmark district.<sup>5</sup>

Model #2 analyzes the opposite outcome—blocks that were removed from the benchmark district. In this analysis, the population consists of all blocks within the old district under the prior configuration. During redistricting these blocks were either kept in the redrawn district or they were moved out of the new district. Model #2 is therefore consistent with the principle of core retention—the idea that mapmakers start with the benchmark configuration and make the minimum changes necessary to reach the ideal district size. Although it may be necessary to remove some portion of an existing district, namely when the district is significantly overpopulated, mapmakers often try to maintain the prior configuration to preserve the linkage between voters and lawmakers.<sup>6</sup>

For example, HD #111, which is not among the challenged districts, was overpopulated by 2,070 persons and therefore needed to shed residents to reach the ideal district size. Consistent with the principles articulated above, mapmakers removed 75 blocks from HD #111 during the most recent round of redistricting, comprising 2,110 persons. In other words, the enacted plan made minimal changes to HD #111, keeping 92% of the core population in the same district as the benchmark plan, paired with the same incumbent.<sup>7</sup>

Finally, Model #3 combines both approaches and examines which blocks were moved into or kept in the redrawn district versus those that were kept out or moved out. Substantively, this analysis looks at the full range of choices available to mapmakers—to simultaneously add *and* remove blocks from the redrawn district.

#### *Independent Variables*

Race is the independent variable of interest in my analysis. An “independent variable” is a factor that may explain the outcome under examination. In my analysis, race is measured as the Black voting age population of persons who listed Black as their race on the 2020 Census, including Black in combination with any other race. I refer to this variable as the BVAP in the pages below, which is

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<sup>5</sup> I did not perform a compactness analysis on any of the districts. My claim is based on a visual inspection of the benchmark district and the enacted district.

<sup>6</sup> According to the NCSL redistricting law guidebook, eleven states explicitly require preserving the core of the old district in legislative and/or congressional redistricting plans. Mississippi is not one of the eleven. Although core retention is widely regarded as a good redistricting principle from a representation standpoint, that does not mean it is inherently race neutral. For example, maintaining the core of a racially gerrymandered district would not be race neutral. Likewise, maintaining the largest possible percentage of an overpopulated district’s core in an overpopulated district would not be race-neutral if the portion drawn out was racially disproportionate.

<sup>7</sup> My data show that 24,233 residents of HD #111 remain in the new district under the enacted plan, out of 26,343 persons prior to redistricting.

short for the total Black voting age population.<sup>8</sup> I use the label BVAP % when referring to the percent Black of voting age (i.e. the BVAP divided by the total voting age population).

In the analysis, the BVAP variable will be statistically insignificant if race does not reliably predict how the district lines were reconfigured. In other words, an insignificant BVAP variable would be an inconclusive result on the question of racial gerrymandering. Alternatively, a significant BVAP variable would indicate that the racial composition of a block was a reliable predictor of its district assignment under the enacted plan. A statistically significant BVAP would therefore constitute evidence of racial gerrymandering. In lay terms, “statistical significance” means the variable in question had a “meaningful” or “important” effect on the outcome under examination, and that effect is unlikely to have arisen by chance.

A particularly notable feature of multivariate logistic regression is that it allows the researcher to statistically disentangle the effect of multiple independent variables. Statisticians refer to this property as “statistical control.” Although researchers are often interested in the effect of a key independent variable, it is necessary to first “account for” or “hold constant” the effect of other variables. By controlling for these other factors, researchers can better determine whether the key independent variable has a causal effect on the outcome of interest or merely “correlates with” the outcome.

My analysis accounts for the effect of partisanship on the design of the challenged districts. Given the strong correlation between race and partisanship in contemporary American politics, including a strong correlation in Mississippi, these are closely related explanations for how the district lines were reconfigured. Absent an analysis that accounts for partisanship, the correlation between race and the district’s configuration may potentially be dismissed as an outcome that was achieved by partisan gerrymandering. In other words, the bivariate correlation between race and how the district lines were drawn may not “survive” a more rigorous examination that controls for partisan motivations.

As an example, imagine that race indeed correlates strongly with the blocks that were drawn out of a hypothetical district. In other words, a simple examination of the raw data indicates that blocks with a large Black voting age population were more likely to be removed from the district in question. In this scenario, although it is undeniable that Black voters *were* more likely to be excluded from the redrawn district, it is possible that this result was the *product of* partisan gerrymandering.<sup>9</sup> Although the outcome is the same from a vote dilution standpoint, the causal or underlying explanation is different. A multivariate analysis like the one used in this report, that properly controls for the effect

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<sup>8</sup> In the state’s benchmark plan documentation, they compute the BVAP (including the BVAP %) using those who list Black as their only race the Census (sometimes called “Black alone”). In the state’s enacted plan documentation, they report both measures, referring to the measure used in my analysis as the APBVAP, presumably short for “any part Black voting age population.”

<sup>9</sup> I am referring to the results of a multivariate analysis, like that used in this report. Alternative kinds of evidence, such as deviations from traditional redistricting principles, the results of computer simulations, the testimony of mapmakers, etc., can also show that voters were moved between districts on the basis of race. On this point, an insignificant BVAP variable does not mean race was *not* a factor in the design of the redrawn districts. As noted above, such a result is considered “inconclusive.” In the language of statistics, an insignificant result means the analysis “fails to reject” the null hypothesis of no relationship between the independent variable and the dependent variable. Indeed, a key principle in statistics is that we never “accept the null hypothesis” and true given that alternative evidence, or alternative methodologies, often exist to examine the research question.

of partisanship and tests both hypotheses in a side-by-side fashion, can yield one of four conclusions.

First, the effect of partisanship may subsume the effect of race, thus providing evidence of partisan gerrymandering but an inconclusive result regarding racial gerrymandering. In the scenario described above, this is the outcome I refer to as “racial gerrymandering as a byproduct of partisan gerrymandering.” Second, the analysis can point in the opposite direction: the effect of race may subsume the effect of partisanship, thus providing evidence of racial gerrymandering but an inconclusive result regarding partisan gerrymandering. A third possibility is that the analysis uncovers evidence of both hypotheses. In other words, the bivariate correlation between race and how the district lines were redrawn was produced by both partisan and racial gerrymandering. Finally, the analysis may indicate that neither race nor partisanship explain how the district lines were redrawn. It is important to note that this outcome can occur if the correlation between race and partisanship is so high that the statistical analysis cannot “disentangle” the two factors.

In the analysis below I measure partisanship using data on Donald Trump’s estimated vote total at the block level in the 2020 election. In the tables, this variable is listed as the Trump Vote. I use data from the 2020 election, and not other elections, because the 2020 contest was the most recent general election (with high voter turnout) at the time the maps were being redrawn. Simply put, if mapmakers relied on partisan information when drafting the enacted plan, the 2020 data were the most accurate and reliable at the time.

My analysis also controls for a block’s population size.<sup>10</sup> I use the total population over eighteen years of age in the block, which comes from the Census, and list the variable as the Total VAP (i.e. the “total voting age population”) in the tables below. Accounting for the effect of population size is important for two reasons. First, because some districts were overpopulated and others underpopulated, one explanation for a district’s configuration is the need to add or remove residents to reach the ideal size. In this respect, the total population variable accounts for the redistricting principle that the districts be equipopulous. Second, the population size of a block correlates with the size of the Black population. In this respect, perhaps mapmakers added or removed blocks with a large Black population simply because the district needed to increase or decrease its overall population (not because of the size of the Black population per se).

Finally, my analysis accounts for the proximity of a block to the border of a neighboring district. Like partisanship and population size, geographic proximity may explain how the district lines were drawn irrespective of any racial motivations. On the one hand, perhaps mapmakers moved a block into the redrawn district because it sat just outside the old district. On the other hand, a block may have been removed from the district because it sat on the periphery of the old district. As noted above, these neighboring blocks may have a higher probability of being redrawn in this manner to comply with redistricting principles like compactness, contiguity, core retention, minimizing subdivision splits, and keeping communities of interest together.

I measure a block’s proximity to a neighboring district based on its VTD assignment under the benchmark plan and whether that VTD is on the border of the district under examination. For Model 1, a block is considered neighboring if it resides in a VTD on the border just outside the old district, and for Model 2, a block is considered neighboring if it resides in a VTD on the border

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<sup>10</sup> Any block that has no population was excluded from the analysis.

inside the old district. In contrast, a block is *not* on the border if it is either within a VTD on the opposite side of the county envelope or it lies deep in the interior of the existing district.<sup>11</sup> I list this variable as Border Block in the tables.

## [6] Redrawn Districts Results

I review the results for each of the challenged districts in the pages below.<sup>12</sup> I place a series of tables with the multivariate statistical results in the appendix at the bottom of this report. In the tables, a positive sign on the BVAP variable indicates that blocks with a large Black population were *more* likely to be: moved in (Model #1), moved out (Model #2), or moved into and kept in the redrawn district (Model #3). Conversely, a negative sign on the BVAP variable indicates that blocks with a large Black population were *less* likely to be: moved in (Model #1), moved out (Model #2), or moved into and kept in the redrawn district (Model #3). Following conventions in the social sciences, stars are used to denote whether the effect is statistically significant.

Another measure of significance is substantive significance, or what researchers call an “effect size.” In lay terms, substantive significance concerns “how much” the variable of interest affects the outcome.<sup>13</sup> When the BVAP variable is statistically significant in one of the analyses, I produce a figure that plots the probability a block was chosen for the redrawn district, placed on the y-axis, varying its Black voting age population along the x-axis.<sup>14</sup> I place these figures in the body of the report. If race was not a substantively important factor, blocks with 0 Black voters should have roughly the same chance of being included in the redrawn district as blocks with 150 Black voters.

### *House District #22*

According to the results in Table 1 for HD #22, race was a significant factor in the blocks removed from the redrawn district. In particular, the positive and statistically significant BVAP variable in Model 2 indicates that Black voters were significantly more likely to be moved out of the district. Because of the control variables in the analysis, the significant effect of race cannot be explained

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<sup>11</sup> If a VTD was split between districts under the benchmark plan, I include the next VTD over in the border calculation. Indeed, a split VTD may only occupy a tiny portion of the district in question and thus be an imprecise measure of proximity.

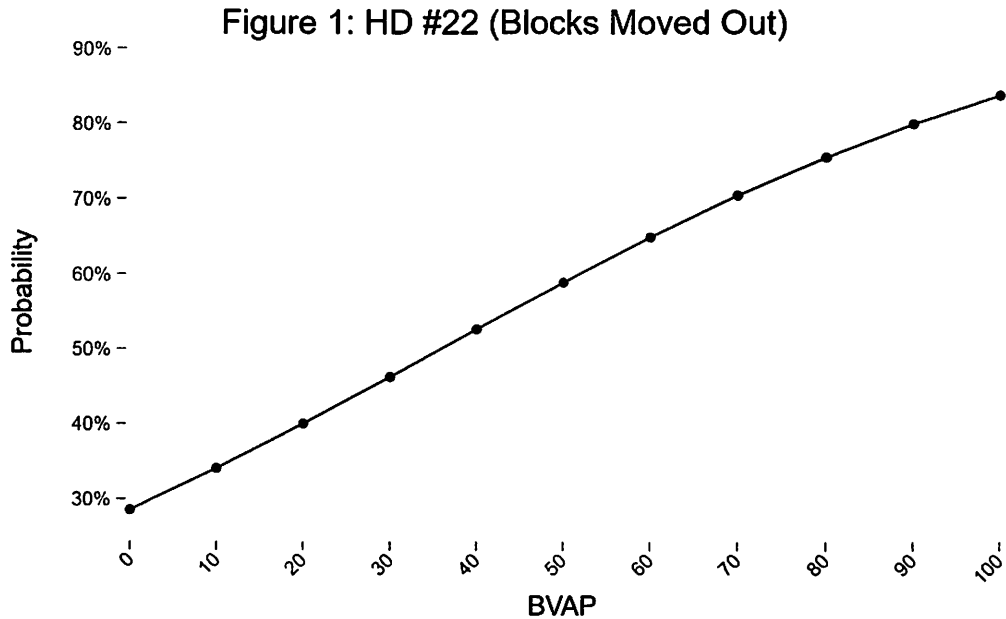
<sup>12</sup> In the tables, the three demographic coefficients were scaled so that the coefficient represents the effect of 10 persons. Except where noted, every model was estimated using the *logit* command in Stata 17.

<sup>13</sup> I compute these probabilities using the *margins* command in Stata 17. Although the BVAP coefficient reflects the size of the effect of race, the number does not have a straightforward interpretation. Because logistic regression uses a non-linear link function (i.e. a logit), the coefficients represent the effect of a 1-unit change in the independent variable on the log odds of the outcome. Likewise, we cannot simply “eyeball” the coefficients and infer their substantive importance. Indeed, the variables have different means, different standard deviations, and are measured in different units, all of which affect the size of the coefficient.

<sup>14</sup> I compute the probabilities varying a district’s BVAP from 0-100 in the House figures and 0-150 in the Senate figures. In both instances, this is the typical range for the challenged districts. It should be noted that this approach is conservative in nature. Because there are blocks in each district with a BVAP that exceeds 100 (House) and 150 (Senate), computing the probabilities using these outlying values (the full range of the variable) would show even larger effect sizes.

away as a byproduct of partisan gerrymandering, an effort to reconfigure the district to make it equipopulous, or a block's geographic proximity to the district's border.

Figure 1 presents the effect size of the BVAP variable in Model 2. In this figure we can see “how much” race mattered in the decision to remove blocks from the district. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had a 29% chance of being drawn out of HD #22. By comparison, blocks with a BVAP of 50 had a 59% chance of being removed from the district and blocks with a BVAP of 100 had an 84% of being drawn out of HD#22.



An examination of the raw data helps to contextualize the above findings. According to the data displayed in Table 2, Black voters represent 49% of those who were drawn out of HD #22 by the enacted plan. By comparison, Black voters comprised 37% of the benchmark district and 32% of voters on the border of the district. In other words, the raw data are consistent with the multivariate results described in the paragraphs above: Black voters were disproportionately removed from HD #22 by the enacted plan.

Among the population of Black voters drawn out of HD #22, the largest portion (61%) were moved into HD #16.<sup>15</sup> Likewise, the largest portion of HD #16's new Black voting age population (69%) came from HD #22.<sup>16</sup> It is therefore no surprise that, even though it was high under the benchmark plan at 61%, the BVAP in HD #16 actually *increases* under the enacted plan to 62%.<sup>17</sup>

<sup>15</sup> HD #15 received 28% of the total BVAP from HD #22 while HD #36 received 11% of the total BVAP.

<sup>16</sup> HDs #17 and #20 contributed 10% of the new total BVAP each to HD #16, while HD #36 contributed 11%.

<sup>17</sup> According to the data, the total voting age population moved from HD #22 to HD #16 was 2,996, with Black voters comprising 1,958.

**Table 2: HD #22 BVAP Data**

	<u>Moved In</u>	<u>On Border</u>	<u>Within Envelope</u>
BVAP	1,865	1,908	4,089
All Voters	6,462	8,183	24,682
BVAP %	29%	23%	17%

	<u>Moved Out</u>	<u>On Border</u>
BVAP	3,186	4,519
All Voters	6,487	14,341
BVAP %	49%	32%

	<u>Benchmark District</u>	<u>Enacted District</u>
BVAP	6,774	5,453
All Voters	18,288	18,263
BVAP %	37%	30%

In light of these findings, it is notable that HD #22's configuration is contrary to several redistricting principles. First, the state's benchmark data show that the district was underpopulated by just 513 residents. Strictly speaking, the district did not require any population adjustment; several districts in the new map have a population deviation of over 1,000 persons.<sup>18</sup> At most, the district needed minimal additions to reach the ideal district size. And yet mapmakers *removed* a large portion of the district's benchmark population,<sup>19</sup> which is inconsistent with the principle of core retention. Specifically, the redrawn HD #22 retains just 65% of its core population when 100% was possible.<sup>20</sup> And as noted above, race was a significant factor in the population removed from the district.

Second, under the benchmark plan HD #22 occupied the entirety of Chickasaw County and split a portion of Pontotoc County. Rather than keeping Chickasaw whole and adding blocks from Pontotoc to reach the ideal size, mapmakers instead removed portions of Chickasaw County, creating a second county split. Once again, the multivariate analysis indicates that race was a factor in the blocks removed from the redrawn districts. On top of this, the enacted plan draws the district into a new county, Monroe, producing a third county split. Not only does Mississippi Code §5-3-101 require minimizing political subdivision splits, but it also states that districts "shall be structured... along county lines."

Third, the enacted plan splits five precincts in HD #22. In all five instances, the portions assigned to HD #22 had a lower BVAP % than the portions assigned to neighboring districts. No doubt the decision to split five precincts in this manner contributed to the BVAP % reduction in HD #22 and

<sup>18</sup> I obtained these statistics from the "Benchmark Demographics" documents on the state's MARIS redistricting website.

<sup>19</sup> Although mapmakers added 1,865 Black voters to HD #22, this does not offset the size of the Black population removed from the district. Indeed, 3,186 Black residents of voting age were removed from the district, hence why the BVAP in HD #22 declined by 7% in the aggregate.

<sup>20</sup> My data show that the district had a total population of any age of 23,760 prior to redistricting. Under the enacted plan, the district maintains 15,439 of these residents.

validates the multivariate analysis showing that race was a significant factor in the composition of the redrawn district. Among the five precinct splits in HD #22, the Nettleton VTD has the largest racial disparity. According to my data, the portion of Nettleton assigned to HD #16 has a BVAP of 64% whereas the portion added to HD #22 has a BVAP of just 15%.<sup>21</sup> In total, the splits assigned to HD #22 had an average BVAP of 22%, comprising 763 Black residents of voting age, compared to 35% for the splits added to a neighboring district, comprising 1,258 Black residents of voting age.

Based on the foregoing evidence, I conclude that race was a significant factor in the design of HD #22. In particular, the multivariate analysis indicates that Black voters were drawn out of the district in a statistically significant and substantively consequential fashion. Critically, these findings exist even when controlling for a host of closely related explanations for the district's configuration, most notably partisan gerrymandering. Various datapoints in the raw data validate the multivariate results. Because of these decisions, the Black voting age population of HD #22 declined from 37% under the benchmark plan to 30% under the enacted plan.

#### *House District #34*

According to the results in Table 3 for HD #34, race was a significant factor in the blocks added to the redrawn district.<sup>22</sup> In particular, the negative and statistically significant BVAP variable in Model 1 indicates that Black voters were significantly less likely to be moved into the district. Although the BVAP variable is insignificant in Model 2, albeit only slightly, the variable is significant and negative in Model 3, the analysis of the combined in and out movement.<sup>23</sup> In other words, the results in the third model indicate that Black voters were significantly less likely to be moved into and kept in the redrawn district. Because of the control variables in the analysis, the significant effect of race in these two models cannot be explained away as a byproduct of partisan gerrymandering, an effort to reconfigure the district to make it equipopulous, or a block's geographic proximity to the district's border.

Figure 2 presents the effect size of the BVAP variable in Model 1. In this figure we can see “how much” race mattered in the decision to add blocks to the district. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had a 33% chance of being drawn into HD #34. By comparison, blocks with a BVAP of 50 had a 6% chance of being added to the district and blocks with 100 Black residents of voting age had less than a 1% chance of being added to HD #34. Figure 3 is the same as Figure 2, but for Model 3, which looks at the combined

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<sup>21</sup> I obtained these statistics from my dataset, but they are also available in the “Full Report House Plan” document on the state’s MARIS redistricting website. Note that a separate and distinct VTD with the name Nettleton (VTD ID = 28081000501) is kept whole in HD #19.

<sup>22</sup> HD #34 was long and slender under the benchmark plan, and so every VTD inside the old district is on the border of the district. For this reason, the border variable cannot be included in Model 2. Further, in Table 4 displaying the raw data the “on the border” BVAP and BVAP % are the same as the benchmark district as a whole.

<sup>23</sup> In Model 2 the BVAP variable is positive, indicating that Black voters were more likely to be drawn out of HD #34, but the p-value is 0.11. Researchers often refer to a variable with a p-value of less than 0.10, but greater than 0.05, as “marginally significant.” In this respect the variable is close to statistical significance, but nonetheless inconclusive.

movement of blocks into and out of HD #34. We can see the same pattern as Figure 2: Black voters were less likely to be moved into and kept in the redrawn district.

An examination of the raw data helps to contextualize the above findings. According to the data displayed in Table 4, Black voters represent 32% of those who were drawn into HD #34 by the enacted plan. By comparison, Black voters were 55% of the county envelope around the district and 51% of the population on the border outside the district. In this respect, the raw data are consistent with the multivariate results described in the paragraphs above: Black voters were disproportionately excluded from HD #34 by the enacted plan.

Figure 2: HD #34 (Blocks Moved In)

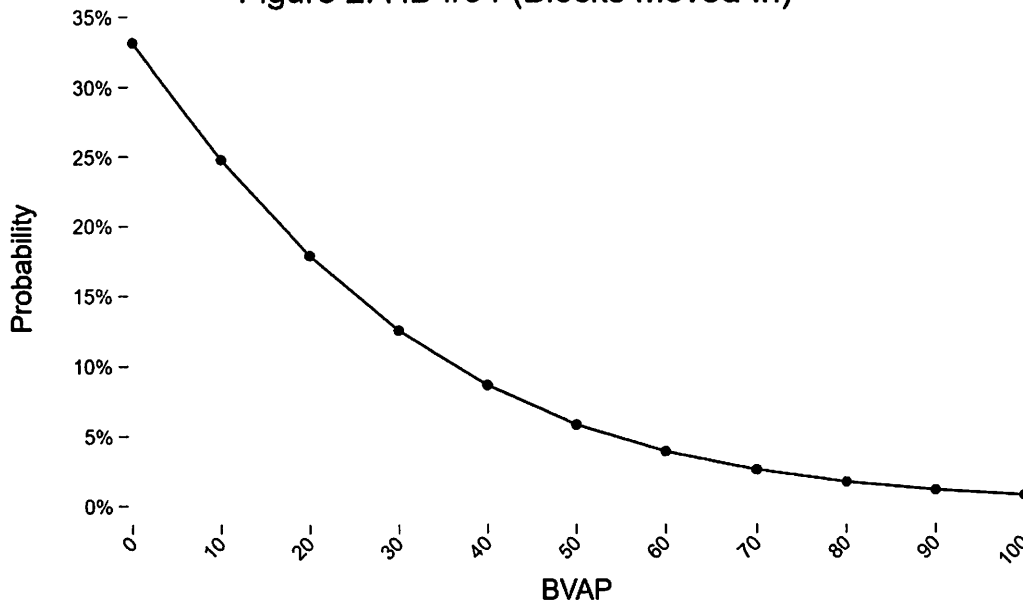
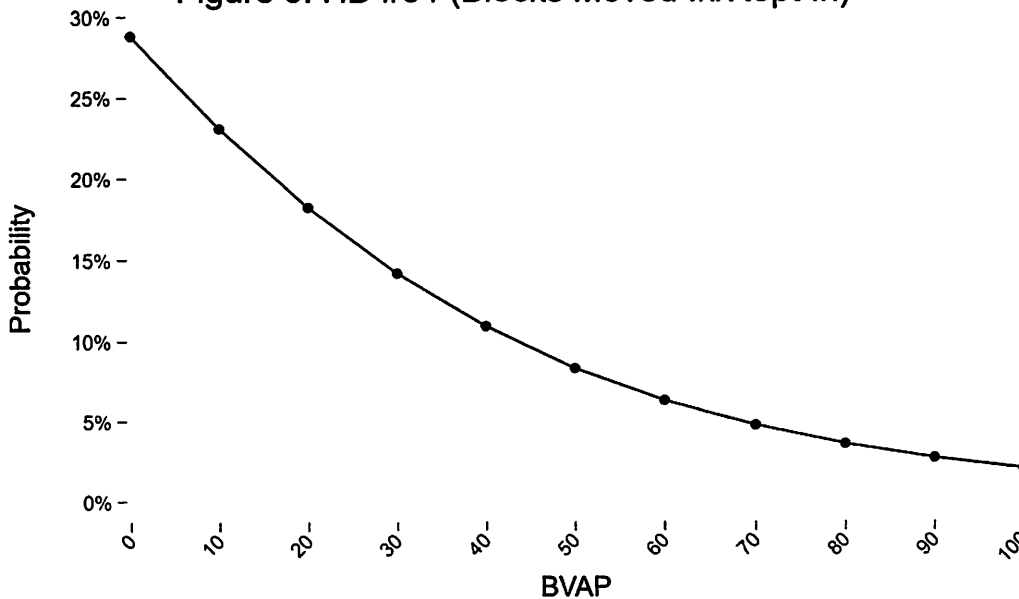


Figure 3: HD #34 (Blocks Moved In/Kept In)



**Table 4: HD #34 BVAP Data**

	<u>Moved In</u>	<u>On Border</u>	<u>Within Envelope</u>
BVAP	4,908	16,587	35,398
All Voters	15,501	32,710	63,919
BVAP %	32%	51%	55%

	<u>Moved Out</u>	<u>On Border</u>
BVAP	8,350	9,761
All Voters	11,611	16,136
BVAP %	72%	60%

	<u>Benchmark District</u>	<u>Enacted District</u>
BVAP	9,761	6,319
All Voters	16,136	20,026
BVAP %	60%	32%

Although it was necessary to add population to HD #34, as the district was underpopulated by 3,253 persons, the enacted plan nonetheless *removed* 15,286 residents and then added 19,502 persons into the district. All in all, the enacted plan maintains just 27% of the district's benchmark population, which is inconsistent with the principle of core retention.<sup>24</sup> Furthermore, we can see in Table 4 that while Black voters made up 60% of HD #34 prior to redistricting, they comprise 72% of those drawn out of the district. Once again, the raw data show that Black voters were disproportionately excluded from HD #34.

Notably, the sweeping changes to HD #34 were triggered by the relocation of HD #33 to the southeastern part of the state. By eliminating a district from the cluster, mapmakers had a range of options when it came to reconfiguring HD #34. It is therefore notable that the enacted plan assigned about half of HD #33's population to HD #34 and the other half to HD #30. A simple look at the raw data reveals that this was not a race-neutral decision. Indeed, the portion assigned to HD #34 had a BVAP of only 35% while the portion assigned to HD #30 had BVAP of 53%. As a result, HD #34's BVAP declined by roughly 30% while HD #30's BVAP, which was high under the benchmark plan, was held constant at 61%.

A possible counterpoint is that the decision to split HD #33's population in this manner was motivated by a desire to keep Yalobusha County whole in the redrawn map and thus follow county borders. Certainly, this would comply with traditional redistricting principles. However, mapmakers violated this principle, twice, when they added tiny portions of both Carroll County and Lafayette

<sup>24</sup> Unlike the data in Table 4, these statistics use the population of any age to match the state's ideal district size calculation. My data show that the district had 21,020 persons of any age prior to redistricting, and only 5,734 remained in the district under the enacted plan.

County to the redrawn HD #34.<sup>25</sup> Notably, these portions of Carroll and Lafayette had BVAP of 12% and 24%, respectively, which likely contributed to the statistically significant effect of race in Models 1 and 3 in Table 3 and the aggregate BVAP % reduction in the district.

It is also notable that the enacted plan splits six precincts between HD #34 and a neighboring district. As noted elsewhere, Mississippi's code directs mapmakers to avoid political subdivision splits. It is also notable that in four of the six instances, the portions assigned to HD #34 had a lower BVAP % than the portions assigned to neighboring districts. The decision to split four precincts in this manner contributed to the BVAP % reduction in HD #34 and validates the multivariate analysis showing that race was a significant factor in the composition of the redrawn district. Among the six precinct splits in HD #34, the Grenada Box 3 VTD has the largest racial disparity. According to my data, the portion of Grenada Box 3 assigned to HD #30 has a BVAP of 76% whereas the portion added to HD #34 has a BVAP of just 10%.<sup>26</sup> In total, the splits assigned to HD #34 had an average BVAP of 24%, comprising 708 Black residents of voting age, compared to 50% for the splits added to a neighboring district, comprising 3,131 Black residents of voting age.

Based on the foregoing evidence, I conclude that race was a significant factor in the design of HD #34. In particular, the multivariate analysis indicates that Black voters were excluded from the redrawn district in a statistically significant and substantively consequential fashion. Critically, these findings exist even when controlling for a host of closely related explanations for the district's configuration, most notably partisan gerrymandering. Various datapoints in the raw data validate the multivariate results. Because of these decisions, the Black voting age population of HD #34 declined from 60% under the benchmark plan to 32% under the enacted plan.

#### *House District #64*

According to the results in Table 5 for HD #64, race was a significant factor in the blocks added to the redrawn district.<sup>27</sup> In particular, the negative and statistically significant BVAP variable in Model 1 indicates that Black voters were significantly less likely to be moved into the district.<sup>28</sup> Although the BVAP variable is insignificant in Model 2, the variable is significant and negative in Model 3, the analysis of the combined in and out movement. In other words, the results in this model indicate Black voters were significantly less likely to be moved into and kept in the redrawn district. Because

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<sup>25</sup> A small portion of HD #34 was in Carroll County prior to redistricting. However, this portion was in the southwest corner of the county and was drawn out of the district by the enacted plan, whereas the new addition, a single VTD, resides in the opposite, northeastern corner of the county.

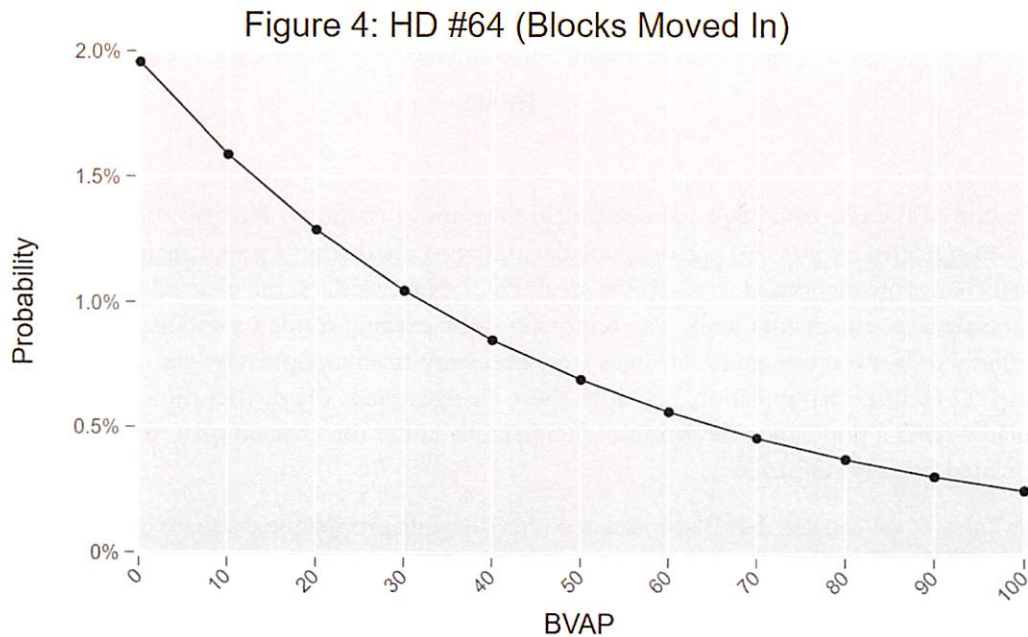
<sup>26</sup> I obtained these statistics from my dataset, but they are also available in the "Full Report House Plan" document on the state's MARIS redistricting website.

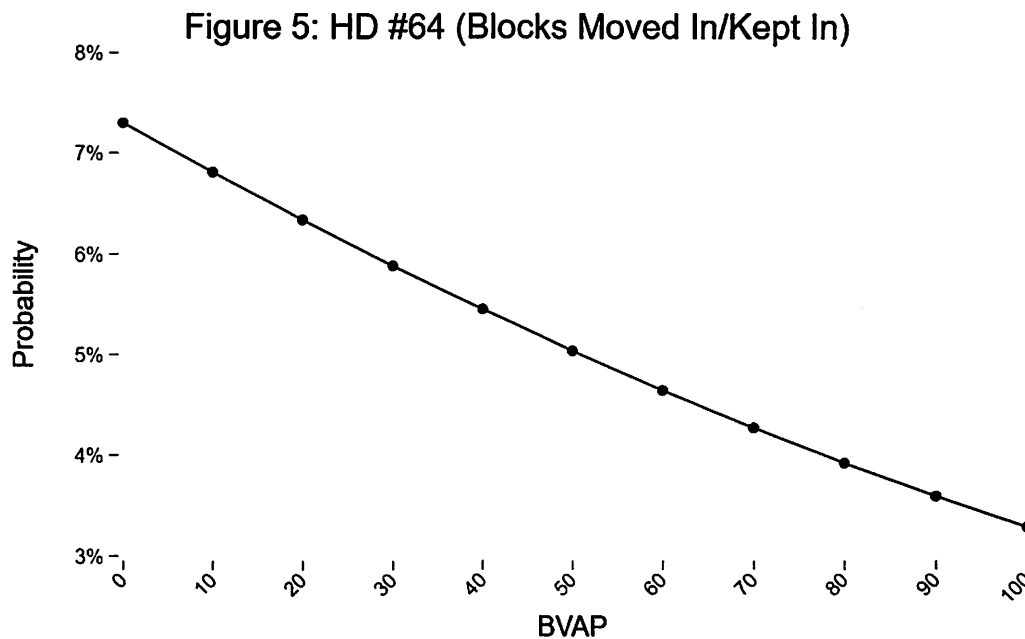
<sup>27</sup> Like HD #34, because every VTD inside HD #64 is along the border of the district, the border variable cannot be included in the Model 2 analysis.

<sup>28</sup> In this analysis the border variable exhibits a statistical property known as separation. Separation occurs when an independent variable (or a combination of independent variables) perfectly predicts one of the outcomes. In this case, the only blocks that were added to HD #64 were along the border of the benchmark district. Following recommendations, Model 1 in Table 5 was estimated using the *firthlogit* command in Stata 17. Using this routine allows the border variable to remain in the analysis as a control variable. Further, the *firthlogit* routine reduces the amount of statistical bias that may occur in the presence of separation. See for example "Bias Reduction of Maximum Likelihood Estimates" by Firth in the journal *Biometrika* (1993). It should be noted that a model estimated using the regular *logit* command produces the same results.

of the control variables in the analysis, the significant effect of race in these two models cannot be explained away as a byproduct of partisan gerrymandering, an effort to reconfigure the district to make it equipopulous, or a block's geographic proximity to the district's border.

Figure 4 presents the effect size of the BVAP variable in Model 1. In this figure we can see “how much” race mattered in the decision to add blocks to the district. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had a 2.0% chance of being drawn into HD #64. By comparison, blocks with a BVAP of 30 had a 1.0% chance of being added to the district and any block with 70 or more Black residents of voting age had less than a 0.5% chance of being added to HD#64. Figure 5 is the same as Figure 4, but for Model 3, which looks at the combined movement of blocks into and out of the district. We can see the same pattern: Black voters were disproportionately excluded from HD #64 by the enacted plan.





An examination of the raw data helps to contextualize the above findings. Notably, because HD #64 was overpopulated by just 320 persons, no adjustment to the district's population was necessary and minimal changes were needed to reach the ideal size.<sup>29</sup> Nevertheless, the enacted plan added 3,822 new residents to the district while also removing 4,457 existing residents under the benchmark plan. In other words, even though no changes were necessary from a population standpoint, the district lost 18% of its core population.<sup>30</sup> Oddly, these changes made the district three times more over-populated (with a population deviation of 963 persons under the enacted plan) than it was under-populated prior to redistricting.

Looking at Table 6, we can see that Black voters comprised a disproportionate share of those moved into and out of HD #64. First, Black voters represent just 19% of those who were drawn into the district by the enacted plan. By comparison, Black voters were 60% of the county envelope around the district and 44% of the population on the border outside the district. Second, although Black voters made up 38% of HD #64 prior to redistricting, they were 59% of the voting age residents drawn out of the district by the enacted plan. In this respect, the raw data are consistent with the multivariate results described in the paragraphs above: Black voters were disproportionately excluded from HD #64 by the enacted plan.

<sup>29</sup> As noted elsewhere in my report, several districts in the enacted plan have a population deviation over 1,000 persons.

<sup>30</sup> Unlike the data in Table 6, for these statistics I use the population of any age to match the state's ideal district size calculation. My data show that the district had 24,593 persons of any age prior to redistricting, and only 20,136 remained in the district under the enacted plan.

**Table 6: HD #64 BVAP Data**

	<u>Moved In</u>	<u>On Border</u>	<u>Within Envelope</u>
BVAP	574	18,988	143,313
All Voters	3,001	43,305	240,708
BVAP %	19%	44%	60%

	<u>Moved Out</u>	<u>On Border</u>
BVAP	2,123	7,464
All Voters	3,590	19,678
BVAP %	59%	38%

	<u>Benchmark District</u>	<u>Enacted District</u>
BVAP	7,464	5,915
All Voters	19,678	19,089
BVAP %	38%	31%

Looking deeper into the raw data, HD #64 and HD #65 trade a sizeable number of residents under the enacted plan—HD #65 gains 4,457 residents from HD #64 (the entire portion drawn out the district) while HD #64 gains 1,276 residents back from HD #65. As noted above, the voting age population drawn out of HD #64 and into HD #65 was 59% Black. Going the other direction, the voting age population added to HD #65 from HD #64 was only 8% Black.<sup>31</sup>

It should be noted that the enacted plan splits two precincts between HD #64 and a neighboring district. Once again, Mississippi's code directs mapmakers to avoid political subdivision splits. It is also notable that in both instances, the portions assigned to HD #64 had a lower BVAP % than the portions assigned to neighboring districts. No doubt the decision to split four precincts in this manner contributed to the BVAP % reduction in HD #64 and validates the multivariate analysis showing that race was a significant factor in the composition of the redrawn district. Among the two precinct splits in HD #64, the Voting District 16 VTD has the largest racial disparity. According to my data, the portion of Voting District 16 assigned to HD #67 has a BVAP of 66% whereas the portion added to HD #64 has a BVAP of just 11%.<sup>32</sup> In total, the splits assigned to HD #64 had an average BVAP of 18%, comprising 684 Black residents of voting age, compared to 59% for the splits added to a neighboring district, comprising 938 Black residents of voting age.

Based on the foregoing evidence, I conclude that race was a significant factor in the design of HD #64. In particular, the multivariate analysis indicates that Black voters were excluded from the redrawn district in a statistically significant and substantively consequential fashion. Critically, these findings exist even when controlling for a host of closely related explanations for the district's

<sup>31</sup> My data show that of the 1,276 residents who were moved from HD #65 into HD #64, 1,081 were of voting age. Among this population, just 85 were Black.

<sup>32</sup> I obtained these statistics from my dataset, but they are also available in the "Full Report House Plan" document on the state's MARIS redistricting website.

configuration, most notably partisan gerrymandering. Various datapoints in the raw data validate the multivariate results. Because of these decisions, the Black voting age population of HD #64 declined from 38% under the benchmark plan to 31% under the enacted plan.

#### *Senate District #2*

According to the results in Table 7 for SD #2, race was a significant factor in the blocks both added to and removed from the redrawn district.<sup>33</sup> In Model 1, the negative and marginally significant BVAP variable indicates that Black voters were significantly less likely to be moved into the district,<sup>34</sup> and in Model 2 the positive and statistically significant BVAP variable indicates that Black voters were significantly more likely to be moved out of the district.<sup>35</sup> Because of the control variables in the analysis, the significant effect of race in these two models cannot be explained away as a byproduct of partisan gerrymandering, an effort to reconfigure the district to make it equipopulous, or a block's geographic proximity to the district's border.

Figure 6 presents the effect size of the BVAP variable in Model 1. In this figure, we can see “how much” race mattered in the decision to add blocks to the district. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had an 18% chance of being drawn into SD #2. By comparison, blocks with a BVAP of 50 had a 16% chance of being added to the district, blocks with a BVAP of 100 had a 15% chance of being added to the district, and blocks with 150 Black residents of voting age had less than a 12% chance of being added to SD#2.

Figure 7 presents the effect size of the BVAP variable in Model 2. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had a 32% chance of being drawn out of SD #2. By comparison, blocks with a BVAP of 50 had a 43% chance of being removed from the district, blocks with a BVAP of 100 had an 54% of being removed from the district, and blocks with 150 Black residents of voting age had a 64% chance of being drawn out of SD#2.

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<sup>33</sup> In both SD #2 and SD #48, the total population variable is highly correlated with other variables in the model, the highest correlation being with the Trump vote variable, creating a problem known as multicollinearity. I therefore omit the total population variable from both Senate models. It is important to note that because the total population variable is so highly correlated with the Trump vote variable, which remains in each analysis, the relationship between a block's total population and the dependent variables is still largely accounted for in the analysis.

<sup>34</sup> It is important to acknowledge that the p-value on the BVAP variable in Model 1 is 0.07, just above the 0.05 cutoff, the conventional threshold for statistical significance. A p-value of 0.07 indicates that there is only a 7% chance of observing a BVAP coefficient like one reported in Model 1 by chance. Researchers often refer to a p-value between 0.10 and 0.05 as “marginal” significance.

<sup>35</sup> Like Model 1 in Table 5, Model 2 in Table 7 was estimated using the *firthlogit* command due to separation. As in that analysis, every district that was moved out of SD #2 was in a VTD on the border. And like Model 1 in Table 5, performing the analysis with the regular *logit* command produces the same results.

Figure 6: SD #2 (Blocks Moved In)

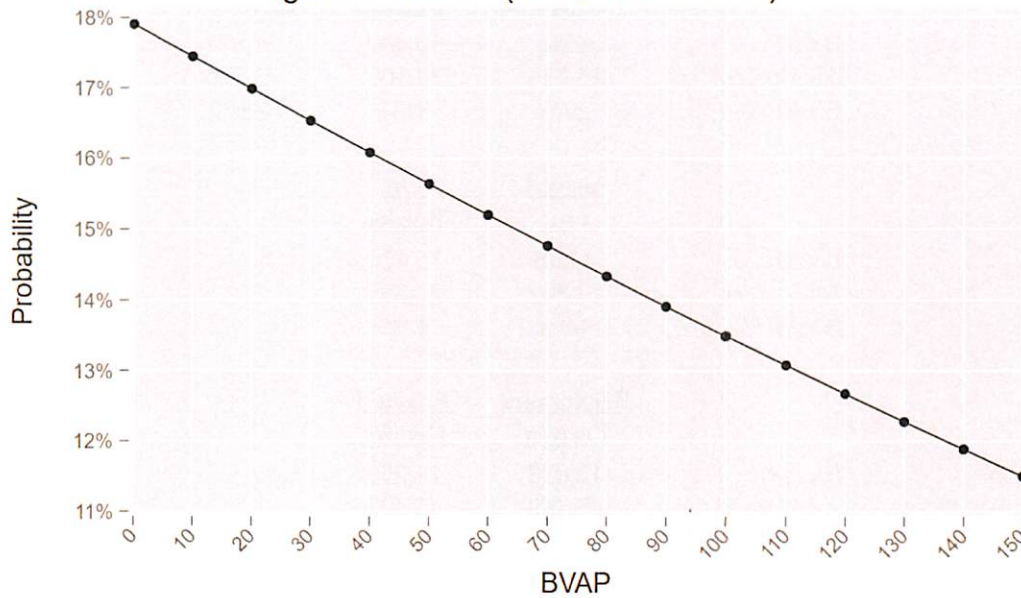
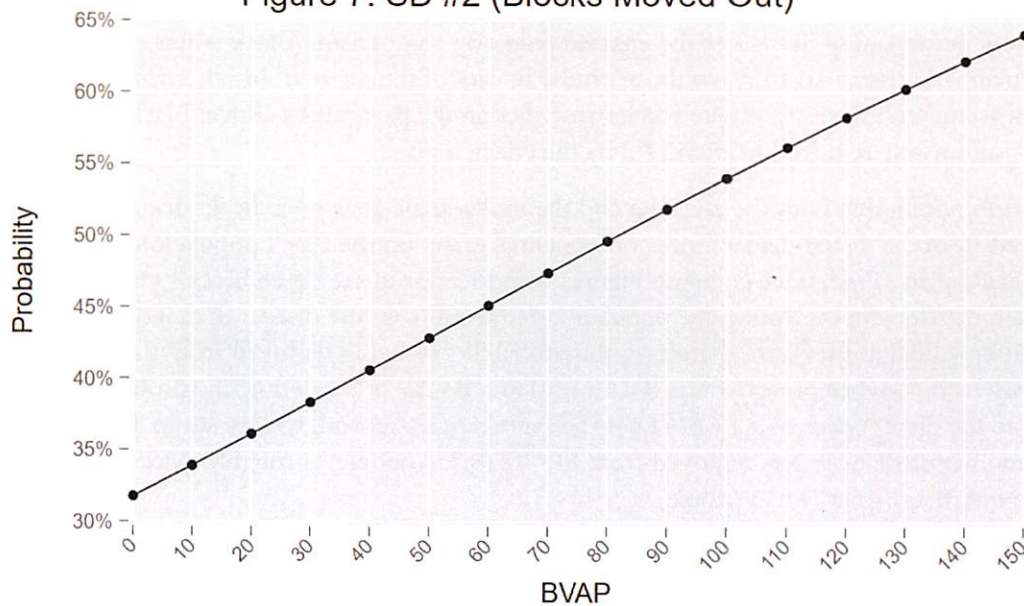


Figure 7: SD #2 (Blocks Moved Out)



An examination of the raw data helps to contextualize the above findings. Looking at the top portion of Table 8, the data show that Black voters represent 29% of those who were drawn into SD #2 by the enacted plan. By comparison, Black voters were 25% of the county envelope around the district and 31% of the population on the border outside the district. Although these statistics point in different directions, the multivariate results described in the paragraphs above (with key control variables included in the analysis) indicate that Black voters were marginally more likely to be excluded from the redrawn district.

**Table 8: SD #2 BVAP Data**

	<u>Moved In</u>	<u>On Border</u>	<u>Within Envelope</u>
BVAP	4,515	10,409	22,827
All Voters	15,756	34,109	92,546
BVAP %	29%	31%	25%

	<u>Moved Out</u>	<u>On Border</u>
BVAP	8,258	16,410
All Voters	17,802	39,295
BVAP %	44%	42%

	<u>Benchmark District</u>	<u>Enacted District</u>
BVAP	18,022	14,279
All Voters	45,468	43,422
BVAP %	40%	33%

Looking at the middle portion of Table 8, the data show that Black voters represent 44% of those who were drawn out of SD #2 by the enacted plan. By comparison, Black voters comprised 40% of the benchmark district and 42% of those on the border of the district. In other words, the raw data are consistent with the multivariate results described in the paragraphs above: Black voters were disproportionately removed from SD #2 by the enacted plan.

It is worth noting that both the raw data and the multivariate analysis indicate that the blocks removed from the district had a more consequential effect on the Black population in SD #2 under the enacted plan. First, if we compare Figures 6 and 7, we can see that a block's racial composition had a larger effect on the voting age population removed from the district than it did on the population added to the district. Indeed, the probability of being removed from the district increases by 32% when going from a BVAP of 0 to a BVAP of 150, while the probability of being added to the district decreases by 6% over the same range. Second, we can see in Table 8 that the total number of Black voters removed from SD #2 (8,258 people) is roughly twice as large as those moved into the district (4,515 people).

Because the district was overpopulated by 4,144 persons, mapmakers needed to reduce SD #2's total population during the most recent round of redistricting. And yet 24,574 residents were drawn out of the district, leaving just 60% of the core population in the reconfigured district. If the enacted plan had removed the 4,144 needed to reach the ideal size, the core left in the redrawn district would be 93%.

Although it did not border SD #2 under the old map, a sizable portion of the 24,574 residents drawn out of the district (35%) were added to SD #11.<sup>36</sup> In so doing, mapmakers drew SD #11

<sup>36</sup> I am using the population of any age in computing these statistics to match the state's ideal district size calculation.

into DeSoto County and around SD #1. Notably, SD #11 had a BVAP of 73% under the benchmark plan, which decreases to 62% after these changes. By comparison, the remaining portion drawn out of SD #2 (65%) had a BVAP of only 40% and was added into SD #1. SD #1 had a BVAP of 20% prior to redistricting, a figure that climbs to 25% under the enacted plan.

It is also notable that the enacted plan splits three precincts between SD #2 and a neighboring district. As noted above, Mississippi's code directs mapmakers to avoid political subdivision splits. On balance, the splits assigned to SD #2 had an average BVAP of 24%, comprising 1,336 Black residents of voting age, compared to 38% for the splits added to a neighboring district, comprising 1,828 Black residents of voting age. Among the three precinct splits in SD #2, the Southhaven West VTD has the largest racial disparity. According to my data, the portion of Southhaven West assigned to SD #11 has a BVAP of 64% whereas the portion added to SD #2 has a BVAP of just 21%.<sup>37</sup> No doubt the decision to split three precincts in this manner contributed to the BVAP % reduction in SD #2 and validates the multivariate analysis showing that race was a significant factor in the composition of the redrawn district.

Based on the foregoing evidence, I conclude that race was a significant factor in the design of SD #2. In particular, the multivariate analysis indicates that Black voters were excluded from the redrawn district in a statistically significant and substantively consequential fashion. Critically, these findings exist even when controlling for a host of closely related explanations for the district's configuration, most notably partisan gerrymandering. Various datapoints in the raw data validate the multivariate results. Because of these decisions, the Black voting age population of SD #2 declined from 40% under the benchmark plan to 33% under the enacted plan.

#### *Senate District #48*

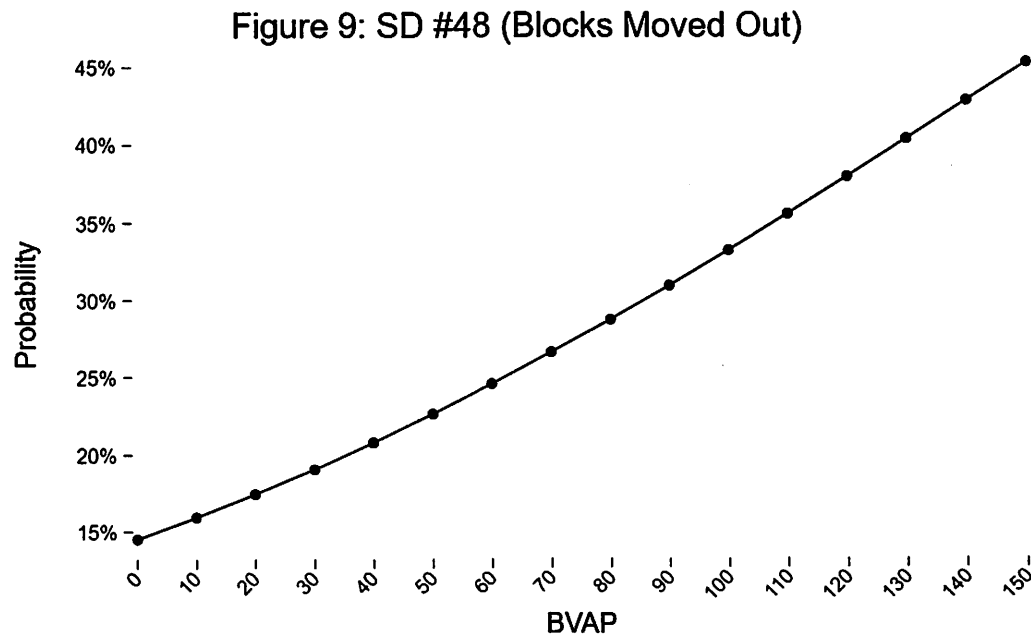
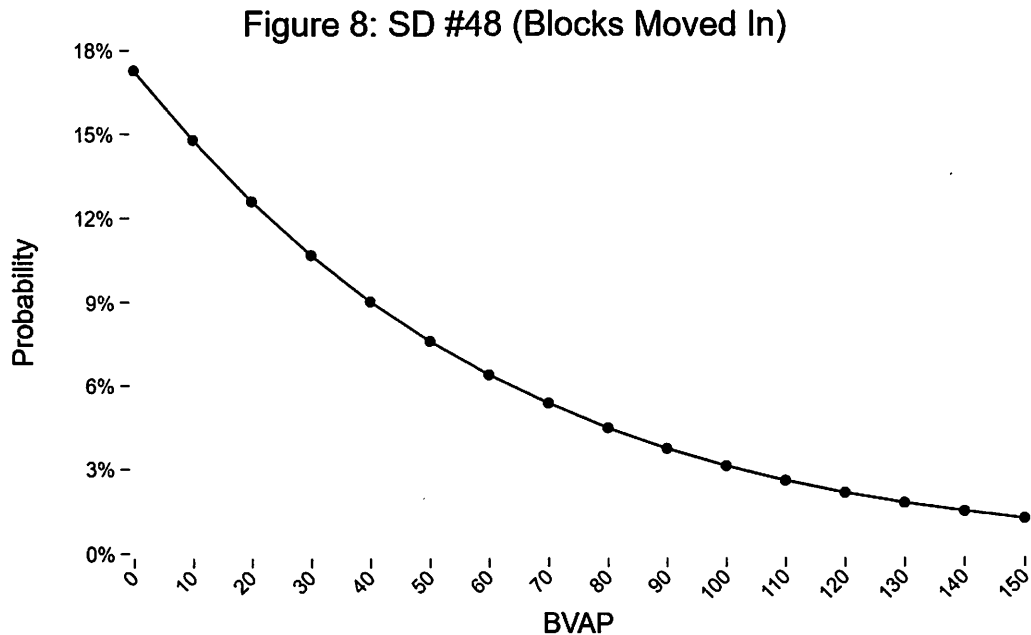
According to the results in Table 9 for SD #48, race was a significant factor in the blocks both added to and removed from the redrawn district.<sup>38</sup> In Model 1, the negative and significant BVAP variable indicates that Black voters were significantly less likely to be moved into the district, and in Model 2 the positive and statistically significant BVAP variable indicates that Black voters were significantly more likely to be moved out of the district. Because of the control variables in the analysis, the significant effect of race in these two models cannot be explained away as a byproduct of partisan gerrymandering, an effort to reconfigure the district to make it equipopulous, or a block's geographic proximity to the district's border.

Figure 8 presents the effect size of the BVAP variable in Model 1. In this figure we can see "how much" race mattered in the decision to add blocks to the district. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had an 17% chance of being drawn into SD #48. By comparison, blocks with a BVAP of 50 had a 9% chance of being added to the district, Blocks with a BVAP of 100 had a 3% chance of being added to the district, and Blocks with 150 Black residents of voting age had only a 1% chance of being added to SD#48.

<sup>37</sup> I obtained these statistics from my dataset, but they are also available in the "Full Report Senate Plan" document on the state's MARIS redistricting website.

<sup>38</sup> As in the analysis for SD #2, Model 2 in Table 9 was estimated using the *firthlogit* command due to separation. And like SD #2, performing the analysis with the regular *logit* command produces the same results but has the advantage of allowing the border variable to remain in the model.

Figure 9 presents the effect size of the BVAP variable in Model 2. Once again, this figure displays “how much” race mattered in the decision to remove blocks from the district. Looking at the left side of the figure, we can see that blocks with no Black residents of voting age had a 15% chance of being drawn out of SD #48. By comparison, blocks with a BVAP of 50 had a 23% chance of being removed from the district, blocks with a BVAP of 100 had an 33% of being removed from the district, and blocks with 150 Black residents of voting age had a 45% chance of being drawn out of SD#48.



An examination of the raw data helps to contextualize the above findings. Looking at the top portion the Table 10, the data show that Black voters represent 17% of those who were drawn into SD #48 by the enacted plan. By comparison, Black voters were 19% of the county envelope around the district and 18% of the population on the border outside the district. Looking at the middle portion of Table 8, the data show that Black voters represent 48% of those who were drawn out of SD #48. By comparison, Black voters comprised 36% of the benchmark district and 43% of those on the border of the district. In summary, the raw data are consistent with the multivariate results described in the paragraphs above: Black voters were disproportionately excluded from SD #48 by the enacted plan.

**Table 10: SD #48 BVAP Data**

	<u>Moved In</u>	<u>On Border</u>	<u>Within Envelope</u>
BVAP	1,687	10,689	22,482
All Voters	9,692	58,431	119,396
BVAP %	17%	18%	19%

	<u>Moved Out</u>	<u>On Border</u>
BVAP	5,607	16,606
All Voters	11,802	39,050
BVAP %	48%	43%

	<u>Benchmark District</u>	<u>Enacted District</u>
BVAP	17,302	13,382
All Voters	47,621	45,511
BVAP %	36%	29%

Because the district was overpopulated by 5,707 persons, mapmakers needed to reduce SD #48's total population during the most recent round of redistricting. And yet 12,208 residents were *added* to the district, resulting in the subsequent removal of 15,930 residents.<sup>39</sup> In total, the district maintains only 75% of its core population under the enacted plan. If mapmakers had followed the principle of core retention and removed the 5,707 residents needed to reach the ideal district size, the redrawn SD #48 would keep 93% of its core population.

Among the 12,208 residents added to SD #48, the bulk (77% or 9,415 residents) came from neighboring Hancock County. Prior to redistricting, Hancock County was entirely within SD #46. With a population of 46,053 in the most recent Census, the entirety of Hancock County could remain in SD #46 and stay well under the ideal district size of 56,948. By drawing SD #48 into Hancock County, mapmakers created a new county split. As noted elsewhere, the state's statutory code

<sup>39</sup> I am using the population of any age in computing these statistics to match the state's ideal district size calculation.

recommends minimizing political subdivision splits and following county boundaries “as closely as possible.” Critically, the portion of Hancock County removed from SD #46 and added to SD #48 had a BVAP of just 17%. As noted above, Black voters were 31% of the population on the border just outside SD #48 and 25% of the population in the county envelope.

Based on the foregoing evidence, I conclude that race was a significant factor in the design of SD #48. In particular, the multivariate analysis indicates that Black voters were excluded from the redrawn district in a statistically significant and substantively consequential fashion. Critically, these findings exist even when controlling for a host of closely related explanations for the district’s configuration, most notably partisan gerrymandering. Various datapoints in the raw data validate the multivariate results. Because of these decisions, the Black voting age population of SD #48 declined from 36% under the benchmark plan to 29% under the enacted plan.

### **[7] VTD Splits**

A consistent feature of the challenged districts is the existence of split precincts, where the portions drawn into the challenged district have a far lower BVAP % than the portions added to a neighboring district. SD #48, which has no VTD splits, is the only one that does not follow this pattern. These splits, which are contrary to traditional redistricting principles, contribute to the significant BVAP % reduction in the remaining challenged districts (HD #22, HD #34, HD #64 and SD #2). I therefore took a closer look at these VTD splits.

Table 11, below, presents the data for each of the challenged districts with VTD splits. HD #64 has the largest disparity of the four districts, with a BVAP of 59% in the split portion assigned to neighboring districts and 18% in the parts drawn into HD #64. At the other end, SD #2 has the smallest gap, with a BVAP of 38% in the split assigned to neighboring districts and 24% in the portion drawn into SD #2. In total, the enacted plan assigns twice as many Black residents of voting age to neighboring districts (7,155) as it does to the challenged districts (3,491).

I address two questions below. First, is the disparity in these VTD splits statistically significant? Although the pattern is unmistakable, perhaps these differences are idiosyncratic in nature. Second, are these disparities a new pattern created by the enacted plan, or is this simply a legacy of the benchmark plan? My analysis shows that these disparities are indeed statistically significant, and thus not a chance occurrence in how VTDs were split, and that they are direct result of the enacted plan.

On the first question, Table 11 includes the result of a “t-test,” also known as a difference of means test. At issue in this type of analysis is whether two means (often representing the average value of two groups) are statistically distinct from one another. An insignificant result would indicate that the two means are not different from one another to a statistically sufficient degree. In other words, insignificance in this context would suggest that the observed difference between two means could be the result of random variation. A statistically significant test, by comparison, would indicate that the difference between the two means is statistically meaningful and thus unlikely to have occurred by chance.

Looking at the bottom of the table, the average BVAP drawn into the challenged districts is 23% while the average assigned to neighboring districts is 41%. Critically, the t-test indicates that this is a statistically significant gap. In particular, the p-value reveals that there is only a 3% chance of observing a disparity like this due to random variation.<sup>40</sup> I conclude that there is a statistically significant pattern in how precincts were split by the enacted plan such that Black voters were systematically excluded from the four challenge districts and assigned to neighboring districts.

**Table 11: VTD Splits in the Challenged Districts  
(Enacted Plan)**

	<u>Challenged Split</u>	<u>Neighboring Split</u>
<u>HD 22</u>		
BVAP	763	1,258
All Voters	3,433	3,641
BVAP %	22%	35%
<u>HD 34</u>		
BVAP	708	3,131
All Voters	2,950	6,230
BVAP %	24%	50%
<u>HD 64</u>		
BVAP	684	938
All Voters	3,841	1,591
BVAP %	18%	59%
<u>SD 2</u>		
BVAP	1,336	1,828
All Voters	5,679	4,801
BVAP %	24%	38%
<u>T-Test</u>		
Average BVAP %	23%	41%
Standard Deviation	18	26
Observations	16	16
T-Value	2.28	
P-Value	0.03	

<sup>40</sup> Table 11 reports the p-value from a two-tailed test examining whether the means are different in either direction (i.e. whether the mean of the challenged districts is greater or lower than the mean of the neighboring districts). From a statistical standpoint, this creates a higher hurdle in the analysis, especially given the limited sample size in this analysis. A one-tailed test examining whether the mean of the challenged districts is statistically lower than the mean of the neighboring districts produces a p-value of 0.01 (i.e. in a one-tailed test, there is only a 1% chance of observing this disparity due to random variation).

On the second question, Table 12 contains the same data and statistical analysis as Table 11, but for the challenged districts under the benchmark plan. At issue is whether the disparities noted above were caused by the enacted plan or are merely a byproduct of decisions from a decade earlier. Both the raw data and the t-test indicate that these disparities did not exist under the benchmark plan.

<b>Table 12: VTD Splits in the Challenged Districts (Benchmark Plan)</b>		
	<u>Challenged Split</u>	<u>Neighboring Split</u>
<u>HD 22</u>		
BVAP	577	264
All Voters	1,758	373
BVAP %	33%	71%
<u>HD 34</u>		
BVAP	4,163	2,853
All Voters	7,961	5,797
BVAP %	52%	49%
<u>HD 64</u>		
BVAP	223	534
All Voters	2,238	2,756
BVAP %	10%	19%
<u>SD 2</u>		
BVAP	466	3,828
All Voters	2,281	9,984
BVAP %	20%	38%
<u>SD 48</u>		
BVAP	1,269	1,448
All Voters	3,390	4,878
BVAP %	37%	30%
<u>T-Test</u>		
Average BVAP %	38%	40%
Standard Deviation	29	29
Observations	19	21
T-Value	0.28	
P-Value	0.78	

First, unlike the enacted plan, there is no clear pattern across districts in Table 12: three districts have a higher BVAP % assigned to neighboring districts while two have a higher BVAP % assigned to the challenged district. Furthermore, the average BVAP in the challenged portion is 38%

compared to 40% in the neighboring portion.<sup>41</sup> Second, and most important, the t-test indicates that this 2% gap in the mean BVAP is not statistically significant with a p-value of 0.78.<sup>42</sup> I conclude that racial disparities in the VTD splits in the challenged districts under the enacted plan are not a legacy of the benchmark plan. Rather, they are a direct consequence of mapmakers' decisions during the most recent round of redistricting.

## [8] Conclusion

As documented in the pages above, I believe that race was a significant factor in the design of each of Mississippi's challenged districts. I hold this opinion to a high degree of certainty. Specifically, my analysis indicates that Black voters were excluded from the five challenged districts in a systematic fashion, producing a consequential reduction in each district's Black voting age population, and that this result is not merely a consequence of alternative motivations, like adherence to traditional redistricting principles or partisan gerrymandering. Both the raw data and an analysis of precinct splits support the multivariate results.

I reserve the right to amend or supplement my report considering additional facts, testimony and/or materials that may come to light. Pursuant to 28 U.S.C. 1746, I declare under penalty of perjury that the foregoing is true and correct according to the best of my knowledge, information, and beliefs.




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Dr. Jordan Ragusa  
August 28, 2023  
Charleston, South Carolina

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<sup>41</sup> SD #48 had several VTD splits under the benchmark plan and none under the enacted plan. I performed a separate analysis where SD #48 was omitted from the calculations in Table 12 to see if the results change: they do not. In this secondary analysis, with SD #48 omitted, the mean BVAP in the challenged portion is 37% and the mean BVAP in the neighboring portion is 39%. Needless to say, this is not a statistically significant difference either (t-value = 0.17, p-value = 0.87).

<sup>42</sup> As earlier, this is the result of a two-tailed difference of means test. A one-tailed test examining whether the mean of the neighboring portion is higher than the challenged portion produces a p-value of 0.39.

## [9] Appendix

**Table 1: Analysis of HD #22**

<u>Variables</u>	<u>Model 1</u> <u>Moved In</u>	<u>Model 2</u> <u>Moved Out</u>	<u>Model 3</u> <u>Moved In/Kept In</u>
BVAP	0.21	0.26**	-0.06
Trump Vote	-1.84***	-0.66**	-0.60***
Total VAP	0.76***	0.12	0.21***
Border Block	-1.04***	0.32	0.45***
Constant	-0.53***	-0.95***	-0.28***
N	999	828	1,827

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 3: Analysis of HD #34**

<u>Variables</u>	<u>Model 1</u> <u>Moved In</u>	<u>Model 2</u> <u>Moved Out</u>	<u>Model 3</u> <u>Moved In/Kept In</u>
BVAP	-0.47***	0.29	-0.35***
Trump Vote	0.70***	-7.91***	1.17***
Total VAP	-0.02	3.32***	-0.22***
Border Block	-1.36***		-1.31***
Constant	-0.40***	1.19***	-0.38***
N	2,963	838	3,801

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 5: Analysis of HD #64**

<u>Variables</u>	<u>Model 1</u> <u>Moved In</u>	<u>Model 2</u> <u>Moved Out</u>	<u>Model 3</u> <u>Moved In/Kept In</u>
BVAP	-0.32***	-0.07	-0.11***
Trump Vote	-0.14*	-1.38***	<-0.01
Total VAP	0.15***	0.32***	0.04
Border Block	6.21***		8.25***
Constant	-9.07***	-1.62***	-8.96***
N	5,062	338	5,400

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 7: Analysis of SD #2**

<u>Variables</u>	<u>Model 1</u> <u>Moved In</u>	<u>Model 2</u> <u>Moved Out</u>	<u>Model 3</u> <u>Moved In/Kept In</u>
BVAP	-0.05*	0.11***	-0.02
Trump Vote	0.06*	-0.27***	0.03
Border Block	4.01***	4.38***	2.44***
Constant	-4.21***	-4.57***	-2.35***
N	1,274	581	1,855

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**Table 9: Analysis of SD #48**

<u>Variables</u>	<u>Model 1</u> <u>Moved In</u>	<u>Model 2</u> <u>Moved Out</u>	<u>Model 3</u> <u>Moved In/Kept In</u>
BVAP	-0.19***	0.11***	0.02
Trump Vote	-0.13***	0.01	-0.23***
Border Block	-0.79***	4.28***	0.62***
Constant	-1.08***	-5.90***	-0.57***
N	2,444	1,346	3,790

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

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"Do the Rich Deserve a Tax Cut?" Presented at the Conference on the Social Legitimacy of Targeted Welfare, organized by Bart Meuleman, Femke Roosma, Tim Reeskens, and Wim van Oorschot, held at the University of Leuven, Brussels, Belgium, January 2016.

"Coordination and Partisanship in Modern Conference Committees." Presented at the Conference on Bicameralism organized by David Rohde and Bruce Oppenheimer and sponsored by the Political Institutions and Public Choice Program at Duke, March 2009.

CONFERENCE ATTENDANCE (PAST 5 YEARS)	<p><i>Southern Political Science Association</i>, 2023. <u>Paper</u> "Ideology and Support for Repeals." <u>Discussant</u> for "Abortion, LGBT+ and Gun Control." <u>Discussant</u> for "Public Opinion."</p> <p><i>Citadel Symposium on Southern Politics</i>, 2020. <u>Discussant</u> for "The South in Congress."</p> <p><i>Southern Political Science Association</i>, 2020. <u>Program Chair</u> for the Legislative Politics Section. <u>Paper</u> "Voting Behavior and Gun Control in Congress." <u>Panel Chair</u> for "Polarization in Congress."</p> <p><i>South Carolina Political Science Association</i>, 2019. <u>Book Panel</u> "First in the South: The Case for the South Carolina Primary" (with Gibbs Knotts). <u>Discussant</u> for "Money, Satisfaction, and Fake News."</p> <p><i>Public Choice Society</i>, 2018. <u>Book Panel</u> "From Enactment to Repeal: Examining the Post-Passage Fate of Landmark Laws" (with Nate Birkhead).</p> <p><i>Citadel Symposium on Southern Politics</i>, 2018. <u>Paper</u> "GOP Bellwether: Explaining South Carolina's Predictive Ability in Republican Nominating Contests" (with Gibbs Knotts).</p> <p><i>Southern Political Science Association</i>, 2018. <u>Paper</u> "From Enactment to Repeal: When and Why Repeals Happen" (with Nate Birkhead). <u>Discussant</u> for "Legislative Capacity." <u>Panel Chair</u> for "Polarization and Political Speech."</p> <p><i>American Political Science Association</i>, 2017. <u>Paper</u> "From Enactment to Repeal: When and Why Repeals Happen" (with Nate Birkhead).</p> <p><i>Southern Political Science Association</i>, 2017. <u>Paper</u> "From Enactment to Repeal: Measuring Repeal Significance" (with Nate Birkhead). <u>Paper</u> "I'm With Her? Why Republican Lawmakers Refused to Endorse Their Party's Nominee" (with Lauren Johnson and Deon McCray).</p>
ACADEMIC AWARDS	<p>Outstanding Reviewer Award in 2019, Political Research Quarterly.</p> <p>Nominated by the Department of Political Science for the University of Florida's 2010-2011 Best Graduate Student Teacher Award.</p> <p>Best Graduate Student Paper in 2010, Florida Political Science Association, for "Chamber Hopping in the US Congress."</p> <p>High Pass on Political Methodology Ph.D. Qualifying Exam.</p> <p>Best Graduate Student Paper in 2008, Florida Department of Political Science, for "Contextual and Institutional Explanations of Macro-Level Policy Change: 1951-2002."</p>
FELLOWSHIPS AND GRANTS	<p>Research Fellow, Center for Public Choice and Market Process (\$71,000 total), 2012-present.</p> <p>Social Science Research Council, Negotiating Agreement in Congress Grant (\$10,000), 2017.</p> <p>College of Charleston Faculty R&amp;D Grant (\$2,650), 2013.</p> <p>Dirksen Center Congressional Research Award (\$2,000), 2012.</p> <p>College of Charleston HSS Dean's Discretionary Research Award (\$6,000 total), 2012, 2016, 2018, 2019, &amp; 2022.</p> <p>University of Florida Supplemental Retention Scholarship, 2011</p>

**FELLOWSHIPS  
AND GRANTS**

H. Douglas Price American Government Research Fellowship, 2010

University of Florida Political Science Summer Scholarship, 2010 & 2009

Prestage-Cook Travel Award, Southern Political Science Association, 2008

University of Florida ICPSR Academic Scholarship and Travel Awards, 2006 & 2007

University of Florida Dauer Research Fellowship, 2007

University of Florida Grinter Fellowship, 2006-2011

**DEPARTMENT  
SERVICE**

- Associate Department Chair (2019-23)
- Chair, Curriculum Committee (2019-23)
- Member, Curriculum Committee (2011-13, 2014-17, 2019-23)
- Director, American Politics Research Team (2015-23)
- Chair, Ad Hoc Advising Committee (2021-22)
- Chair, Ad Hoc T&P Committee (2022-23)
- Member, Geography Committee (2022-23)
- Chair, American Politics/Methods VAP Search Committee (2022)
- Member, Comparative Politics/International Relations VAP Search Committee (2021)
- Member, Intellectual Life Committee (2013-17, 2018-19)
- Chair, Intellectual Life Committee (2015-17, 2018-19)
- Member, Geography Program Tenure-Track Search (2019)
- Member, William V. Moore Research Conference Committee (2018-20)
- Member, Ad Hoc Job Search Practices Committee (2015-16)
- Member, Ad Hoc Student Recruitment Committee (2014-15)
- Member, American Politics/Behavior Search Committee (2014-15)
- Member, Environmental Policy Search Committee (2012-13)
- Graduate School Advisor (2011-17)
- Library Liaison (2012-16)

**COLLEGE  
SERVICE**

- Research Director, Center for Public Choice and Market Process (2019-23)
- At Large Faculty Senator (2020-23)
- Secretary, Ad Hoc Gun Violence Committee (2021-23)
- Member, College Curriculum Committee (202-23)
- Alternate Member, Tenure & Promotion Review Committee (3 cases)(2021-22)
- External Member, Library Tenure, Promotion & Third-Year Review Panel (4 cases)(2020)
- Member, Strategic Plan Steering Committee (2019-20)
- External Member, Psychology Tenure, Promotion & Third-Year Review Panel (3 cases)(2019)
- Chair, Student Affairs and Athletics Committee (2015-17)
- Member, Student Affairs and Athletics Committee (2013-17)

PROFESSIONAL SERVICE	<ul style="list-style-type: none"><li>• Editorial Board Member, Political Research Quarterly (2018-23)</li><li>• Advisory Board, Charleston, Civil Rights, and Civics (C3) Program (2023)</li><li>• Expert Witness, Federal Redistricting Litigation (2021-22)</li><li>• Program Chair, Southern Political Science Association (2021-22)</li><li>• Program Chair, Southern Political Science Association (2020-21)</li><li>• External Letter Writer, Dr. Richard Yon, West Point (2021)</li><li>• External Letter Writer, Dr. Matt Thornburg, USC-Aiken (2020)</li><li>• Program Chair, Southern Political Science Association (2014-15)</li><li>• Member, Pi Sigma Alpha Award Committee, <i>Southern Political Science Association</i>, 2013</li><li>• Journal Referee: American Political Science Review, American Journal of Political Science, The Journal of Politics, Legislative Studies Quarterly, American Politics Research, British Journal of Political Science, Political Research Quarterly, The Journal of Law and Courts, Social Science Quarterly, Publius, Environment and Planning</li></ul>
TECHNICAL SKILLS	Stata, SPSS, Qualtrics, Excel, L <sup>A</sup> T <sub>E</sub> X, HTML, WordPress, Prezi
REFERENCES	Available upon request.